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EXAMINER	
BERNSTEIN, DANIEL A	

ART UNIT	PAPER NUMBER
3743	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,405	LAMBERTS ET AL.	
	Examiner	Art Unit	
	DANIEL A. BERNSTEIN	3743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,10-18,20-22,24 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-5,10-18,20-22,24 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1 rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,149,424 to Marrecau.

In Reference to Claim 1

Marrecau discloses a gas burner, comprising: a metal burner membrane (see Fig. 1, 16 and 18) configured such that, during use, gas penetrates before being ignited and resulting in visible flames, wherein said membrane comprises a fabric comprising stainless steel fibers (Marrecau shows a membrane which has indentations to improve flame stability and to prevent retrograde movement of the flame. A gas mixture enters the radiant burner through duct 12 and is distributed through screen 14 where the gas combusts on the surface of the membrane. The flame created at the membrane would inherently be visible as is well known to someone of ordinary skill in the art and is common in radiant burners with membranes. Also the gas will inherently penetrate the membrane where it contacts an oxidant (air), which is needed for combustion. Even if Marrecau had added an oxidant before the gas reached the membrane, some of the gas would penetrate the membrane and remain uncombusted, since gas burners are never 100% efficient. Furthermore Marrecau states that “Radiant burners with a

ceramic membrane having some indentations are known in the art, e.g. from U.S. Pat. No.1,731,053. The function of these indentations, however, is to enhance the **flame** stability and to prevent a retrograde movement of the **flame**. A great distinction between radiant burners with a ceramic membrane and radiant burners with a membrane comprising a fabric of metal fibers, is that with a fabric of metal fibers the problem of **flame** stability has already been solved irrespective of the global form of the membrane. So even with a flat membrane no problems of **flame** instability will be present.")

wherein said membrane of the gas burner comprises a base section (see numeral 20 points to the base section) having a smallest radius of curvature being R-base (radius of curvature of the base 16 near 20): and a closing section (numeral 22 points to the closing section), and a transition region (numeral 24 points to the transition region) connecting said base section to said closing section (the burner membrane 16 and 18 is continuous), wherein said membrane is uninterrupted, and wherein said transition region has having a smallest radius of curvature r-transition (following the radius of curvature of 16, the base radius of curvature is clearly larger than the transition radius of curvature) being larger than or equal to 0.02 x R-base and being smaller than or equal to 0.7 x R-base (the base of 16 is wider then the top of 16).

Marrecau does not teach the range where the transition radius of curvature being larger than or equal to 0.02 x R-base and being smaller than or equal to 0.7 x R-base.

Marrecau teaches that by providing the radiant burner with an undulated burner membrane as apposed to a flat burner membrane, the temperature of the membrane is substantially increased. The burner of Marrecau is provided with an undulated burner

membrane for the purpose of increasing the surface area of the flame and also to radiate heat from the base of the membrane to the top of the membrane and thereby increasing the total radiant heat output of the burner. This undulated membrane functions in the same manner as claimed by the applicant. The membrane is formed out of two porous structures, 16 and 18, which are stainless steel and knitted FeCrAlY fibers respectfully. When bent into shape the perforated membrane inherently has different levels of porosity throughout the curvature of the membrane. In areas where the membrane has a lower radius of curvature, the mesh structure of the membrane will be more dense and be more prone to inhibit the flow of gas, which would slow the flow rate (velocity) of the gas. In areas where the radius of curvature is higher, the mesh structure would not be as compacted and therefore would more easily allow gas to penetrate the membrane, this would result in a high flow rate (velocity).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to optimize the range of the transition radius of curvature of Marrecau for the purpose of optimizing the heat output range of the radiant burner. It is well known to someone of ordinary skill in the art that an undulated burner membrane can raise the heat output of a radiant burner higher than a conventional flat type radiant burner. Therefore, it would have been obvious to optimize the range of the transition radius of curvature of Marrecau's burner membrane to obtain a desired heat output of the radiant burner.

<u>In Reference to Claim 5</u>

Marrecau discloses a gas burner as in claim 1, wherein said membrane further comprises a foraminated plate (16 is a perforated metal screen made out of stainless steel, Marrecau), a foraminated sheet, or a deep drawn or stamped wire mesh for supporting said fabric.

3. Claims 2-4, 10-11 and 20-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Marrecau in view of US 6,065,963 to Dewaegheneire (Dewaegheneire).

In Reference to Claim 3

Marrecau discloses a gas burner as in claim 1, but does not teach wherein said stainless steel fibers are arranged essentially parallel into bundles.

Dewaegheneire teaches a conical surface burner with a membrane (2, Fig. 1) that comprises stainless steel fibers that are arranged essentially parallel into bundles (Col. 2 lines 7-17).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau with Dewaegheneire for the purpose of providing the burner of Marrecau with a perforated metal fabric membrane made out of stainless steel in which the stainless steel fibers where arranged essentially parallel into bundles. This would have been an obvious design choice, because stainless steel and FeCrAlY are recognized known equivalents and because there are only so many known methods of arranging stainless steal into bundles and a parallel configuration is well known to someone of ordinary skill in the art as evidenced by Dewaegheneire.

Therefore, it would have been obvious to combine Marrecau with Dewaegheneire, because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 4

Marrecau in view of Dewaegheneire discloses a gas burner as in claim 3, wherein said bundles are knitted or braided or woven (Dewaegheneire, Col. 1 lines 5-6).

In Reference to Claim 10

Marrecau discloses a gas burner as in claim 5, but does not teach wherein said base section has a shape of a conical surface of a frustum of a cone.

Dewaegheneire teaches a metal burner membrane with a shape of a conical surface of a frustum of a cone (see Fig. 1-2 where the base of metal burner membrane 2 is formed by a cone and the top of 2 is flat).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau with Dewaegheneire for the purpose of providing the burner of Marrecau with a metal burner membrane that has a frustoconical shape at the base of the membrane. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 11

Marrecau in view of Dewaegheneire discloses a gas burner as in claim 5, wherein said base section has a cylindrical shape (see Fig. 1 where the base section clearly has a cylindrical shape).

In Reference to Claim 20

A gas burner as in claim 3, wherein said membrane further comprises a foraminated plate (screen 16, Fig. 1 of Marrecau), a foraminated sheet, or a deep drawn or stamped wire mesh for supporting said fabric.

In Reference to Claim 21

A gas burner as in claim 4, wherein said membrane further comprises a foraminated plate (screen 16, Fig. 1 of Marrecau), a foraminated sheet, or a deep drawn or stamped wire mesh for supporting said fabric.

4. Claims 12 and 16-18 rejected under 35 U.S.C. 103(a) as being unpatentable over Marrecau in view of Dewaegheneire and in further view of US 2,822,799 to Sterick (Sterick).

In Reference to Claim 12

Marrecau in view of Dewaegheneire discloses a gas burner as in claim 10, but does not teach wherein said transition region is part of a torus surface delimited by two planes perpendicular to an axis of symmetry of said torus.

Sterick teaches a metal burner membrane with a torus structure (see Fig. 3, a torus is a doughnut like shape with a depressed middle).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau in view of Dewaegheneire with Sterick for the purpose of providing the burner of Marrecau with a metal burner membrane that has a torus shape. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 16

Marrecau in view of Dewaegheneire and in further view of Sterick discloses a gas burner as in claim 12, wherein said closing section is a small inverted sphere cap (see Fig. 2 of Sterick which shows a depression in the membrane) such that a depression forms at a center of said burner membrane.

In Reference to Claim 17

Marrecau in view of Dewaegheneire discloses a gas burner as in claim 11, but does not teach wherein said transition region is part of a torus surface delimited by two planes perpendicular to an axis of symmetry of said torus.

Sterick teaches a metal burner membrane with a torus structure (see Fig. 3, a torus is a doughnut like shape with a depressed middle).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau in view of Dewaegheneire with Sterick for the purpose of providing the burner of Marrecau with a metal burner membrane that has a torus shape. All of the claimed elements were known in prior art

and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 18

Marrecau in view of Dewaegheneire discloses a gas burner as in claim 11, but does not teach wherein said transition region is in a form of a circular ridge.

Sterick teaches a metal burner membrane with a torus structure that has a transition region in the form of a circular ridge (see Fig. 3, a torus is a doughnut like shape with a depressed middle).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau in view of Dewaegheneire with Sterick for the purpose of providing the burner of Marrecau with a metal burner membrane that has a torus shape with a transition region in the form of a circular ridge. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

5. Claims 13-15 rejected under 35 U.S.C. 103(a) as being unpatentable over Marrecau in view of US 3,857,670 to Karlovetz et al. (Karlovetz).

In Reference to Claim 13

Marrecau discloses a gas burner as in claim 5, but does not teach wherein said base section has a polygonal cross section, the corners of said cross section being rounded.

Karlovetz teaches a metal burner membrane (18) that has a base section that has a polygonal cross section, the corners of said cross section being rounded (the cross section of the base in Fig. 8 is polygonal and has rounded corners).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau in view of Dewaegheneire with Karlovetz for the purpose of providing the burner of Marrecau with a metal burner membrane that has a polygonal shape with rounded corners. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 14

Marrecau discloses a gas burner as in claim 5, but does not teach wherein said base section has a rectangular cross section, the corners of said cross section being rounded.

Karlovetz teaches a metal burner membrane (18) that has a base section that has a rectangular cross section, the corners of said cross section being rounded (the cross section of the base in Fig. 8 is rectangular and has rounded corners).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau in view of Dewaegheneire with Karlovetz for the purpose of providing the burner of Marrecau with a metal burner membrane that has a rectangular shape with rounded corners. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 15

Marrecau discloses a gas burner as in claim 5, but does not teach wherein said base section is a truncated pyramid, said pyramid having rounded edges.

Karlovetz teaches a metal burner membrane (18) that has a base section that is a truncated pyramid, the corners of said cross section being rounded (the cross section of the base in Fig. 8 is a truncated pyramid and has rounded corners, a truncated pyramid is a pyramid that has its top removed).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Marrecau in view of Dewaegheneire with Karlovetz for the purpose of providing the burner of Marrecau with a metal burner membrane that has a base with a truncated pyramid with rounded corners. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their

respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

6. Claims 22 and 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Marrecau.

In Reference to Claim 22

Marrecau discloses a gas burner as in claim 1, but does not teach wherein the smallest radius of curvature R-base of the base section and the smallest radius of curvature r-transition of the transition region follow the following relation: 0.02 x R-base greater then or equal to r-transition less than or equal to 0.35 x R-base.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to optimize the range of R-base and r-transition for the purpose of obtaining desired flame shape and temperature characteristics. Marrecau discloses a burner membrane with uneven flame shape characteristics. It would have been obvious to one of ordinary skill at the time of conception to design and optimize the shape of the burner membrane. This optimization of ranges would not have entailed undue experimentation and would have been within the capabilities of someone of ordinary skill in the art.

In Reference to Claim 24

Marrecau discloses a gas burner as in claim 1, but does not teach wherein the smallest radius of curvature R-base of the base section and the smallest radius of curvature r-transition of the transition region follow the following relation: 0.09 x R-base greater then or equal to r-transition less than or equal to 0.35 x R-base.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to optimize the range of R-base and r-transition for the purpose of obtaining desired flame shape and temperature characteristics. Marrecau discloses a burner membrane with uneven flame shape characteristics. It would have been obvious to one of ordinary skill at the time of conception to design and optimize the shape of the burner membrane. This optimization of ranges would not have entailed undue experimentation and would have been within the capabilities of someone of ordinary skill in the art.

In Reference to Claim 25

Marrecau discloses a gas burner as in claim 1, but does not teach wherein the smallest radius of curvature R-base of the base section and the smallest radius of curvature r-transition of the transition region follow the following relation: 0.18 x R-base greater then or equal to r-transition less than or equal to 0.35 x R-base.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to optimize the range of R-base and r-transition for the purpose of obtaining desired flame shape and temperature characteristics. Marrecau discloses a burner membrane with uneven flame shape characteristics. It would have been obvious to one of ordinary skill at the time of conception to design and optimize the shape of the burner membrane. This optimization of ranges would not have entailed undue experimentation and would have been within the capabilities of someone of ordinary skill in the art.

Response to Arguments

7. Applicant's arguments filed 06/22/2009 have been fully considered but they are not persuasive. The applicant argues that r-transition is a results effective variable and there would be no reason or evidence for one of ordinary skill to optimize the range of r-transition in light of the teachings of Marrecau. The examiner respectfully disagrees with the applicant. Marrecau teaches a curved membrane of a radiant burner, which is shaped in the same manner as claimed by the applicant, for the purpose of optimizing the output heat of the burner. Both Marrecau and the applicant are optimizing the heat output of a radiant burner based on the same membrane shape. Optimizing the range of the transition radius would have been obvious at the time of the invention to achieve a given heat output based on the teachings of Marrecau whether the optimization occurred as a result of measuring the gas flow or the heat value based on the curvature of the membrane (see rejection of claim 1 above).

The applicant also argues that Marrecau is concerned with internal radiation reflection and not with gas flow distributions as indicated by arrows 26 in Fig. 1. The examiner agrees that Marrecau does show and teach increasing the heat radiated from a membrane of a radiant burner by adding curvature to the membrane. The examiner disagrees with the applicant that the teaching of Marrecau would not be subjected to an optimization based on gas flow that would lead one of ordinary skill in the art to the claimed range of r-transition. The undulated burner membrane of Marrecau inherently effects the gas flow and gas penetration of the membrane. This would also affect the flame pattern on the membrane. And since the structure of Marrecau is analogous to

that claimed by the applicant and both the applicant and Marrecau are optimizing the curvature of a burner membrane to produce a radiant burner with a particular heat output, it would be obvious to one of ordinary skill in the art to optimize the range of r-transition.

The applicant argues further that there is no motivation to combine Marrecau with Dewaegheneire because neither reference discusses the impact the radii of curvature have on the flame front. The examiner respectfully disagrees. Marrecau teaches optimization of the r-transition of the undulated burner membrane for the reasons discussed above and Dewaegheneire teaches a known shape of a burner membrane. It would have been obvious to someone of ordinary skill in the art to design the burner membrane of Marrecau with a conical surface of a cone to affect the heat value or the radiant burner. Marrecau teaches that adding a known pattern or shape to a burner membrane is an improvement over a flat burner membrane. Therefore, it would have been well within the capabilities of someone of ordinary skill in the art to use a frustum of a cone as the shape of the undulated burner membrane of Marrecau to modify the flame pattern and heat output of the burner.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL A. BERNSTEIN whose telephone number is (571)270-5803. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Rinehart can be reached on 571-272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAB

/Kenneth B Rinehart/
Supervisory Patent Examiner, Art Unit 3743